

Figure 1

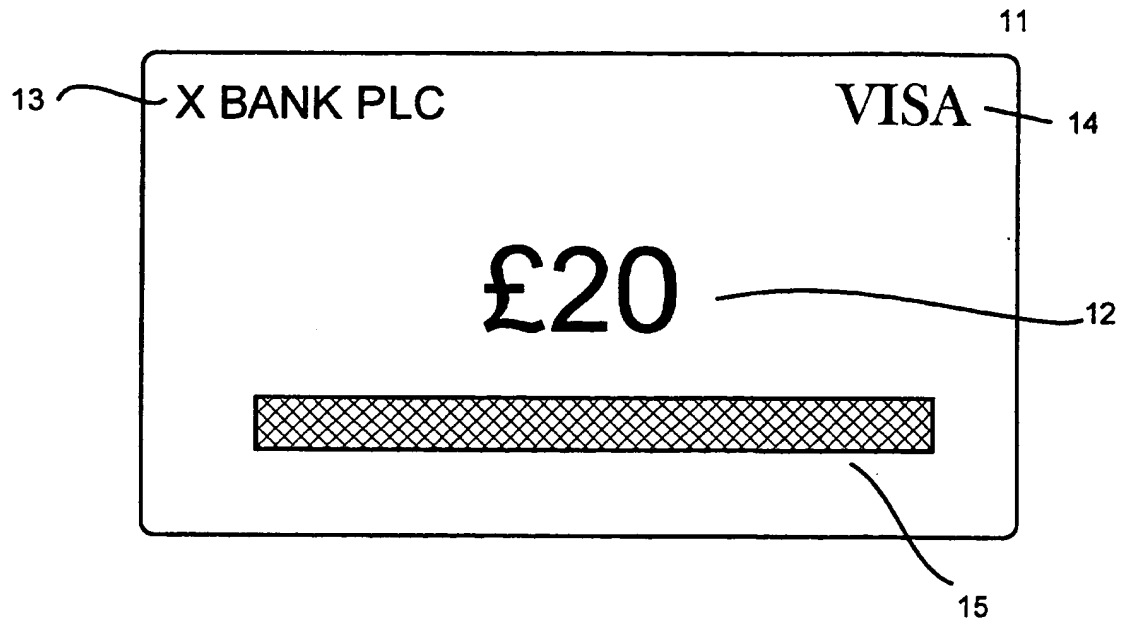


Figure 2a

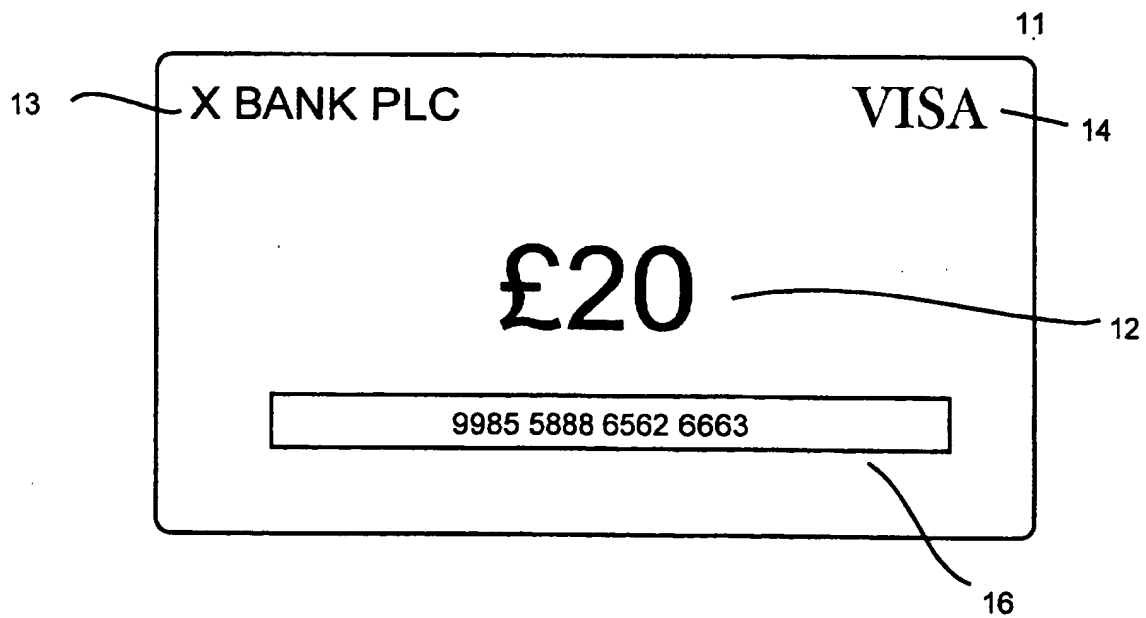


Figure 2b

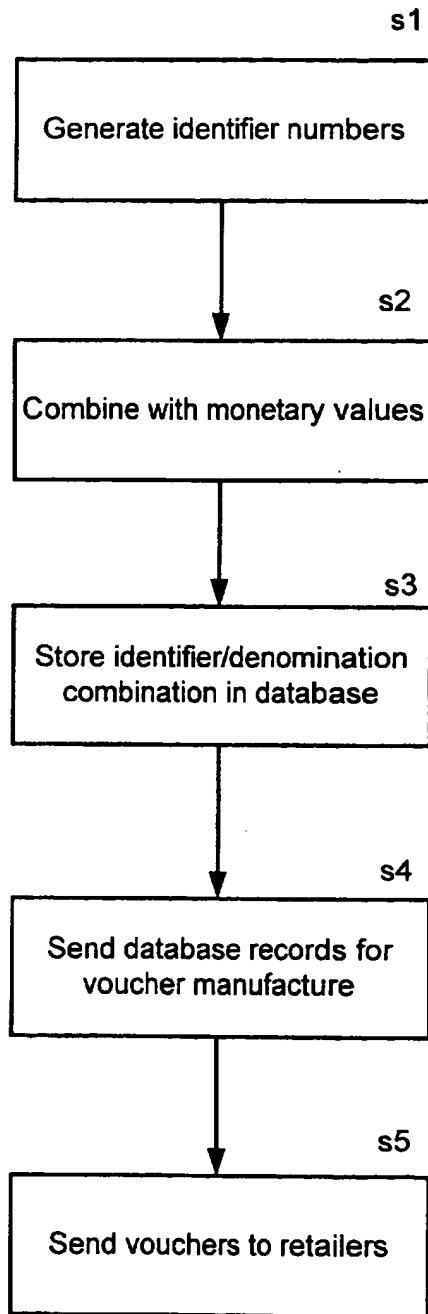


Figure 3

Payment Identifier 16	Denomination 12 (£)
9985 5888 6562 6663	20
9985 3467 9961 0000	50
9985	14.10

Figure 4

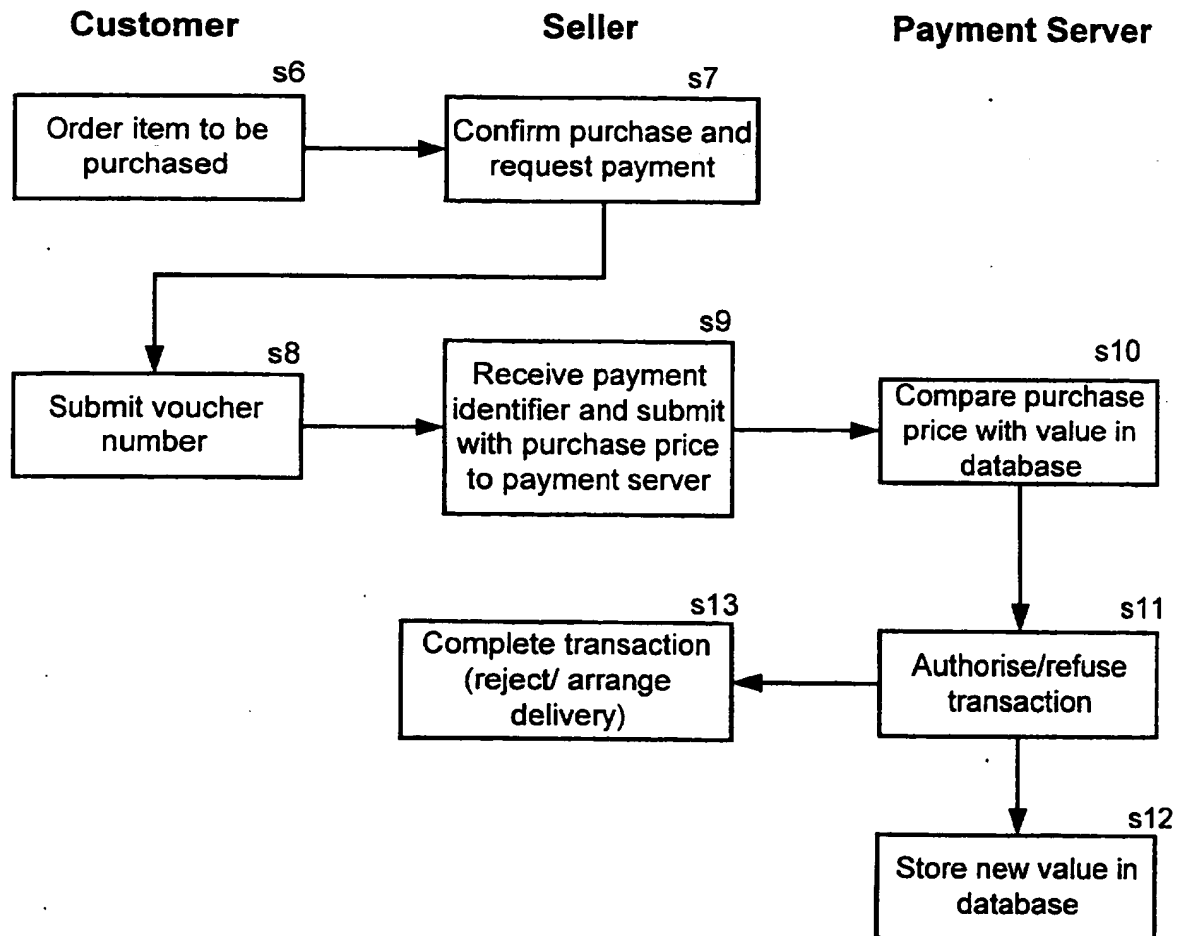


Figure 5

Electronic Payment System

The present invention relates to the field of electronic payment systems, particularly but not exclusively for making payments over the Internet.

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The recent upsurge in the number of companies seeking to conduct business over the Internet, referred to generally as e-commerce, has resulted in a significant increase in the number of online transactions. To date, credit cards and other forms of 'plastic' money, including debit cards and charge cards, have been the most
10 common method of payment for e-commerce transactions.

However, the limitation to this form of payment to conduct online business provides a substantial barrier to participation. A significant proportion of the population do not own credit cards, typically because they are under-age or do not
15 have a sufficient credit rating. Even amongst those who do own credit cards, fear of fraud on what is still a relatively new medium, generates a reluctance to provide credit card details over the Internet, despite the protection guarantees offered by credit card companies. Finally, of increasing concern to many is the potential lack of privacy arising from the build-up of data held by the card companies on personal
20 shopping habits.

An electronic payment method for use on the Internet is disclosed in EP 0 820 620 B1. This describes a network having retailer stations and customer stations together with a payment server. The payment server checks whether a purchase price for a
25 planned transaction between customer and retailer is authorised, by querying the customer's personal account set up in the payment server for paying small amounts, or, in the case of larger amounts, making a query over a banking network.

The disadvantage of this system is the requirement for customers to subscribe to it,
30 which again raises a barrier to participation. Furthermore, each customer must open a personal account in the payment server, which, as for credit cards, gives rise to eligibility and privacy concerns.

To address the above problems, there is provided, according to the invention, a method of electronic payment for a purchase to be made by a buyer from a seller, comprising the steps of providing a payment identifier from the buyer to the seller, the payment identifier being issued in exchange for a monetary value pre-paid on
5 behalf of the buyer at a pre-payment point, sending the payment identifier from the seller to a payment server, and determining at the payment server whether the monetary value corresponding to the payment identifier is sufficient to cover the purchase.

10 The method can comprise providing the payment identifier from the buyer to the seller over a communications network such as the Internet, for example in respect of a purchase to be made over the Internet. The payment identifier can be sent from the seller to the payment server over a network such as the Internet or by telephone.

15 If the payment server confirms that the monetary amount is sufficient to cover the purchase, it can confirm that to the seller and deduct the amount of the purchase from the monetary amount recorded against the payment identifier.

20 The method according to the invention does not require customer details to be stored anywhere on the system, and so is capable of providing considerably enhanced privacy. Further, since there is no requirement for a customer to set up an account, the method according to the invention can permit a much wider range of people, including minors, to participate in e-commerce transactions.

25 According to the invention, there is further provided an electronic payment system for making payments in respect of a proposed purchase between a buyer and a seller, comprising a pre-payment point for obtaining a payment identifier corresponding to a monetary value pre-paid on behalf of the buyer, means for
30 providing the payment identifier from the buyer to the seller in response to a request for payment, and a payment server including a database configured to store the monetary value corresponding to the payment identifier, for receiving the

payment identifier from the seller and determining whether the monetary value corresponding to the received payment identifier is sufficient to cover the purchase.

The means for providing the payment identifier from the buyer to the seller can
5 comprise means for providing the identifier over a communications network such as the Internet.

The pre-payment point can be connectable to the payment server such that the payment identifier and the monetary value corresponding to the payment identifier
10 are known to both the payment server and the pre-payment point. The pre-payment point can be an automated voucher dispenser.

According to the invention, there is also provided a payment server for authenticating a purchase transaction between a buyer and a seller over a
15 communications network, the server being configured to store a payment identifier and a monetary value associated with the payment identifier, the payment identifier corresponding to that obtained by the buyer at a pre-payment point, the server further comprising means for receiving the payment identifier supplied by the buyer for the purchase transaction, and means for informing the seller as to whether the
20 monetary value stored at the server and corresponding to the received payment identifier is sufficient to cover the purchase price associated with the purchase transaction.

Embodiments of the invention will now be described, by way of example, with
25 reference to the accompanying drawings, in which:

Figure 1 is a schematic diagram of an electronic payment system according to the invention;

Figure 2a is a schematic drawing of a scratch-card type payment voucher for use in the system of Figure 1;

30 Figure 2b is a schematic drawing of the payment voucher shown in Figure 2a, with the scratch-off portion removed to reveal a payment identifier;

Figure 3 is a schematic flow diagram illustrating the production of vouchers with unique payment identification numbers;

Figure 4 is a schematic diagram illustrating an extract from the payment server database records; and

Figure 5 is a schematic flow diagram illustrating the purchase of goods over the Internet using the system of Figure 1.

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Referring to Figure 1, a customer 1 can connect via a customer computer 2 to any one of a plurality of seller e-commerce systems 3, 4 via a communications network 5, for example, the Internet. The customer computer 2 is, for example, a Pentium-based computer running Microsoft Windows 98™ and using a dial-up connection to
10 access the Internet 5. The seller computers 3, 4 are, for example, Pentium-based server machines running Microsoft Windows NT™, with web page hosting provided through the Microsoft IIS™ web server application. The electronic payment system shown in Figure 1 further comprises a payment server 6, which includes a database 7, connected to the Internet 5, and pre-payment points 8, 9 which are connected to
15 the payment server 6 through, for example, the public telephone network 10 or via the Internet 5. Each pre-payment point 8, 9, for example a retailer such as a newsagent, dispenses payment vouchers 11 which are sold to customers on payment of the face value of the voucher. For example, the voucher 11 shown in Figure 2a with a face value 12 of £20, is sold to a customer 1 in a conventional way by
20 payment of £20 in cash, by cheque, credit card or other form of payment acceptable to the pre-payment point 8, 9. The customer can alternatively receive a voucher which has been bought for him or her, for example as a gift.

Referring to Figure 2a, the voucher 11 includes the name 13 of the voucher issuer, which maintains the payment server 6, as well as the name of a payment guarantor
25 14, for example VISA or MASTERCARD, who provide a guarantee of card validity and consumer rights in the same way as they would for credit cards bearing their name. The linking of payment vouchers to the VISA/MASTERCARD network enables vouchers to be used at any web site which accepts these cards, and so can
30 assist in ensuring that this pre-paid voucher payment method becomes widely accepted on the Internet. The voucher 11 also includes a scratch-off panel 15 which conceals a payment identifier 16 shown in Figure 2b. The payment identifier 16 is, for example, a unique number shown when the panel 15 has been scratched

off. The payment identifier 16 can alternatively be a bar code. In a further embodiment, a voucher 11 includes a payment identifier number 16 and a corresponding bar code, enabling the voucher to be both used over the Internet and easily scanned, for example, in a supermarket to pay for goods. In the bar code
5 embodiments, the customer hands the voucher to the retailer, who scans the payment identifier code. This code is then sent for authorisation to the payment server 6, for example by telephone, as in the case of the VISA network.

As well as the ability to use the voucher for purchases over the Internet and in
10 conventional shops, the voucher can have additional uses such as serving as a pre-paid mobile telephone voucher which is not specific to any particular network. Other features which could be included in alternative embodiments include advertising on vouchers, making use of the single or at least limited use nature of the vouchers.

15 The way in which a retailer 8, 9 obtains supplies of payment vouchers for resale will now be described in detail, with reference to Figure 3. First, the voucher issuer 13 generates the payment identifier numbers 16 using a predetermined algorithm, for example, by random number generation of a number of specified length, for
20 example, 16 digits (step s1). In an alternative embodiment, number generation is carried out in a way which is analogous to the way in which credit card numbers are allocated, based on similar algorithms. After generation of the unique numbers, they are associated with the particular denomination 12 of vouchers to be issued (step s2), depending on the market requirements. For example, a payment identifier
25 number can be associated with a value of £10, £20 or £50, or any other value which a retailer can sell. Referring to Figures 3 and 4, the combination 17 of a payment identifier number 16 and its particular denomination 12 is stored in the database 7 at the payment server 6 (step s3). The contents of the database 7 comprising a
30 batch 18 of identifier/denomination records 17 is then sent to a voucher manufacturer which manufactures the vouchers 11 in accordance with the records (step s4). The manufactured vouchers 11 are then sent to the various retailers 8, 9 (step s5), payment by the retailer being made in accordance with the contractual relationship between the voucher issuer and the retailer. The database 7 at the

payment server therefore has a record of all the voucher payment identifier numbers 16 and their corresponding face values 12 which have been sent out to retailers, as shown in Figure 4.

5 Referring to Figure 5, when the customer 1 wishes to make a purchase from a specific online seller 3 over the Internet 5 using a purchased voucher 11, he or she establishes an Internet connection in the usual way via the customer computer 2, connects to the seller's web site and selects and orders the item to be purchased, for example, by clicking on an 'order' button on the seller's web site (step s6). The
10 seller 3 confirms the purchase request and generates a request for a payment identifier 16 via a form on its web site (step s7).

Assuming, for example, that the purchase is for goods worth £14.99 and that the customer wishes to pay with a £20 voucher 11, the customer 1 enters the payment
15 identifier 16, for example the number 9985 5888 6562 6663, onto the form and clicks on a 'submit' button (step s8). The seller receives the payment identifier 16 and submits it with the purchase price of the goods to the payment server 6 for verification (step s9). The payment server 6 compares the purchase price with the value stored against the received payment identifier 16 in its database 7 (step s10)
20 and authorises the transaction if the value is sufficient to cover the purchase price, otherwise it rejects the transaction (step s11). In the example given above, the payment server 6 determines that a value of £20 is recorded against the received number 9985 5888 6562 6663 and therefore replies to the seller with confirmation that the transaction is authorised (step s11). In the event of authorisation, the
25 payment server 6 also deducts the purchase price from the voucher value and records the new value in the database, so that the value stored against the payment identifier number 9985 5888 6562 6663 becomes £5.01 (step s12), indicating that £5.01 is available for subsequent transactions using that voucher. The seller, having received confirmation that the transaction is authorised, completes the transaction
30 in the normal way by arranging for delivery of goods to the customer (step s13). Subsequent settlement between the voucher issuer and the seller is analogous to the settlement process for credit cards; for example, the seller sends the voucher to the

voucher issuer, who pay the seller in accordance with the contractual relationship between them.

The existence of a database of payment identifiers associated with values at the
5 payment server 6 permits balance and statement of transaction enquiries to be made
by a customer 1, either over the Internet 5 or by telephone over the PSTN 10. In
addition, the balance can be topped up by the customer, for example by
conventional payment using a credit card over the telephone, or by transfer of the
balance from one payment identifier to another. To prevent automated balance
10 enquiry attacks in which a programmer seeks to find valid numbers, security
facilities can be introduced, such as a request for additional information; for
example, requesting the customer to enter a specified digit or the initial i.e. face
value of the card. Additional features include the possibility of financial incentives,
such as the payment of interest against funds stored against a payment identifier
15 under specified circumstances, so creating the possibility of a 'virtual' bank, using
only numbers as references.

While the above example has been described in terms of a ready-made payment
voucher issued by a retailer, it will be evident to the skilled person that numerous
20 variations to this arrangement are possible. In alternative embodiments of the
invention, the voucher is pre-printed at the point of sale with information supplied
from the database 7, for example by automatically requesting a payment identifier
from the payment server 6 over the Internet or over a telephone link to correspond
with the voucher value requested by the customer. In this case, the pre-payment
25 point 8,9 can be a retailer or other form of distributor having printing facilities, for
example a utility pay-point, national lottery outlet or an automatic printing facility
such as the ticket machines available at railway or underground stations, adapted to
provide the additional ability to dispense pre-payment vouchers. Furthermore, the
payment voucher need not be provided in a physical form at all, but could be a
30 payment identifier number or other token printed on any kind of base material, or
even delivered orally or in electronic form.

It will also be understood that the circulation of payment identifiers over the Internet can be further protected by any of the well-known cryptographic methods for protecting data transmissions over this medium.

- 5 While the payment system has been primarily described in relation to purchases over the Internet, the skilled person would understand that it can also be used with any other form of network or other forum in which a buyer can communicate with a seller.

Claims

1. A method of electronic payment for a purchase to be made by a buyer from a seller, comprising the steps of:
 - 5 providing a payment identifier from the buyer to the seller, the payment identifier being issued in exchange for a monetary value pre-paid on behalf of the buyer at a pre-payment point;
 - sending the payment identifier from the seller to a payment server; and
 - determining at the payment server whether the monetary value corresponding to the
 - 10 payment identifier is sufficient to cover the purchase.
2. A method according to claim 1, comprising the step of sending the payment identifier from the seller to the payment server over a communications network.
- 15 3. A method according to claim 2, wherein the communications network comprises a telephone network.
4. A method according to claim 2, wherein the communications network comprises the Internet.
- 20 5. A method according to claim 2, 3 or 4, wherein the communications network comprises a first communications network, further comprising providing the payment identifier from the buyer to the seller over a second communications network.
- 25 6. A method according to claim 5, wherein the second communications network comprises the Internet.
7. A method according to any one of the preceding claims, including the step
- 30 of sending the result of the determination to the seller.
8. A method according to any one of the preceding claims, further comprising, in the event that the payment server determines that the monetary value is sufficient

to cover the purchase, deducting the purchase value from the monetary value recorded against the payment identifier.

9. An electronic payment system for making payments in respect of a proposed
5 purchase between a buyer and a seller, comprising:
a pre-payment point for obtaining a payment identifier corresponding to a monetary value pre-paid on behalf of the buyer;
means for providing the payment identifier from the buyer to the seller in response to a request for payment; and
10 a payment server including a database configured to store the monetary value corresponding to the payment identifier, for receiving the payment identifier from the seller and determining whether the monetary value corresponding to the received payment identifier is sufficient to cover the purchase.

- 15 10. A system according to claim 9, wherein the means for providing the payment identifier from the buyer to the seller comprises means for providing said identifier over a communications network.

11. A system according to claim 10, wherein said communications network
20 comprises the Internet.

12. A system according to any one of claims 9, 10 or 11 wherein the pre-payment point is connectable to the payment server such that the payment identifier and the monetary value corresponding to the payment identifier are known to both
25 the payment server and the pre-payment point.

13. A system according to any one of claims 9 to 12, wherein the pre-payment point comprises an automated voucher dispenser, said voucher including a payment identifier.

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14. A system according to any one of claims 9 to 13, wherein the payment identifier comprises a number.

15. A system according to claim 14, wherein said number is associated with a monetary value only.

16. A system according to any one of claims 9 to 15 wherein the payment
5 identifier includes a bar code.

17. A system according to claim 16, when dependent on claim 14 or 15, wherein the bar code corresponds to the number.

10 18. A payment server for authenticating a purchase transaction between a buyer and a seller over a communications network, the server being configured to store a payment identifier and a monetary value associated with the payment identifier, the payment identifier corresponding to that obtained by the buyer at a pre-payment point, the server further comprising means for receiving the payment identifier
15 supplied by the buyer for the purchase transaction, and means for informing the seller as to whether the monetary value stored at the server and corresponding to the received payment identifier is sufficient to cover the purchase price associated with the purchase transaction.

20 19. A payment server according to claim 18, further comprising means for deducting the purchase price from the stored monetary value to produce a residual monetary value associated with the payment identifier.

20. An electronic payment system substantially as hereinbefore described with
25 reference to the accompanying drawings.

21. A method of electronic payment substantially as hereinbefore described with reference to the accompanying drawings.

30 22. A payment server substantially as hereinbefore described with reference to the accompanying drawings.



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Examiner: Michael Logan
Date of search: 18 August 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.R): G4V (VAK)
Int Cl (Ed.7): G06F 17/60; G07F 7/10
Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	EP 0814441 A1 (FRANCE TELECOM) whole document relevant	1-3,7-10, 12,14,18
X	WO 98/48388 A2 (GIESECKE) whole document relevant	1-3,9,10
X	WO 98/30985 A2 (AEROTEL) see page 2, lines 18-32	1-4,7-11, 14,18,19
X	WO 98/13795 A1 (BILLINGSLEY) whole document relevant	1-4,7-11, 14,18,19
X	WO 96/38801 A1 (AMERICAN EXPRESS) see page 11, line 29 - page 12, line 27	1-3,5,9,10 14,18,19
X	US 5721768 (CALL PROCESSING) see column 6, line 66 - column 7, line 25	1-3,7-10, 12-19

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